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EXAMINER

SELLERS, DANIEL R

ART UNIT PAPER NUMBER

2644

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/935,349	WEARE, CHRISTOPHER B.	
	Examiner	Art Unit	
	Daniel R. Sellers	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/30/2001</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "900" and "910" have been used to designate both a comparison step and an FFT, and a finish step and a critical band filtering step, respectively, in figures 8D and 9A. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 390, 635, and 844. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing

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date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 110, 111, and 135. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the "input space" (IS) in figure 4D as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being

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amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Regarding claim 17, it is not clear what principal component analysis is. The office regards the feature vector as being comprised of principal components, or salient features, of the audio data, and principal component analysis is an analysis of the feature vector.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

9. Claim 21-25, 27, and 29 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Blum et al., U.S. Patent 5,918,223 (hereinafter Blum).

10. Regarding claim 21, see Blum

*A method of classifying data according to spectral properties of the data, comprising:
assigning to each media entity of a plurality of media entities in a data set to at least one spectral properties class; (Col. 22, lines 31-33)
processing each media entity of said data set to extract at least one spectral properties characteristic based on digital signal processing of each media entity; (Col. 22, lines 45-48)
generating a plurality of spectral properties vectors for said plurality of media entities, wherein each spectral properties vector includes said at least one spectral properties class and at least one spectral properties characteristic based on digital signal processing; and (Col. 22, lines 48-50)
forming a classification chain based upon said plurality of feature vectors. (Col. 22, lines 55-65)*

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Blum teaches a method of classifying data according to its spectral properties with these features.

11. Regarding claim 22, the further limitation of claim 21, see

... further comprising:

processing an unclassified media entity to extract at least one spectral properties characteristic based on digital signal processing of the unclassified media entity; (Col. 21, lines 55-58)

generating a vector for the unclassified media entity including said at least one digital signal processing spectral properties characteristic; (Col. 21, lines 58-60)

presenting the vector for the unclassified media entity to the classification chain; and classifying the unclassified entry with an estimate of the spectral properties class by calculating the representative spectral properties class of the subset of the plurality of vectors of the classification chain located in the neighborhood of the vector for the unclassified entity. (Col. 21, line 66 – Col. 22, line 3)

Blum teaches these features in a method of classifying data.

12. Regarding claim 23, the further limitation of claim 22, see Blum

... further including calculating a neighborhood distance that defines a distance within which two vectors in the classification chain space are in the same neighborhood for purposes of being in the same spectral properties class. (Col. 22, lines 3-20)

Blum teaches a calculation of a neighborhood distance.

13. Regarding claim 24, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches classifying the entries according to statistical properties of the spectral properties of an entry, such as standard deviations or range values (Col. 21, lines 61-63). It is inherent to use the median to describe skewed sample ranges (Col. 22, lines 21-26).

14. Regarding claim 25, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches a method of describing an unclassified entry according to a numerical value with these features.

15. Regarding claim 27, the further limitation of claim 21, see Blum

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A computer readable medium bearing computer executable instructions for carrying out the method of claim 21. (Col. 5, lines 41-49)

Blum teaches a computer readable medium bearing instructions for a method with the features of claim 21.

16. Regarding claim 29, the further limitation of claim 21, see the preceding argument with respect to claim 27. Blum teaches at least one computing device for performing the method.

17. Claims 30-33 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Gjerdingen et al., U.S. Patent No. 6,539,395 (hereinafter Gjerdingen).

18. Regarding claim 30, see Gjerdingen

A computing system, comprising:

a computing device including:

a classification chain data structure stored thereon having a plurality of classification vectors, wherein each vector includes data representative of a spectral properties class as classified by humans and spectral properties characteristics as determined by digital signal processing; and (Col. 3, lines 50-54 and Col. 9, lines 32-39)

processing means for comparing an unclassified media entity to the classification chain data structure to determine an estimate of the spectral properties class of the unclassified media entity. (Col. 6, line 66 – Col. 7, line 2)

Gjerdingen teaches a computing system with these features to create a searchable database.

19. Regarding claim 31, the further limitation of claim 30, see Gjerdingen

... wherein said determining of an estimate of the spectral properties class includes returning at least one number indicating the level of confidence of the spectral properties class assignment. (Col. 10, lines 53-57)

Gjerdingen teaches a level of confidence indicator.

20. Regarding claim 32, the further limitation of claim 31, see the preceding argument with respect to claims 30 and 31. It is inherent that a system using the

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method taught by Gjerdingen will undergo an improvement in classification with experts review and more data samples (Col. 8, lines 19-24).

21. Regarding claim 33, see the preceding argument with respect to claim 30.

Gjerdingen teaches a system with human and DSP classification techniques regarding the spectral properties of media entities.

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and "Fundamentals of Speech Recognition" by Rabiner and Juang (hereinafter Rabiner).

24. Regarding claim 1, see Blum

A method for automatically classifying spectral properties of audio data, comprising:

applying input audio data (1) to a critical band filtering process to form first output data and (2) to an entropy calculation process to form second output data; (Col. 6, lines 24-28)

applying the first output data to a first derivative process to form third output data; (Col. 6, lines 28-30) and

inputting said first, second and third output data to an averaging process to form a spectral feature vector representing the input audio data. (Col. 6, lines 32-35 and lines 45-48)

Blum teaches a method for automatically classifying spectral properties of audio data, wherein a feature vector is created with the above features. The critical band filtering process, as taught by Blum, is a Mel-frequency cepstral coefficient process. Blum does

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not teach the entropy calculation for use in a feature vector, however Blum has described a feature vector with a plurality of metrics. Rabiner teaches pattern recognition methods for use in speech signals. Rabiner discusses both a cepstral transform (pp.163-171) and the mel-frequency scale (pp. 183-190). On page 449, Rabiner teaches the usefulness of an entropy measure. Rabiner states, "Equivalently, a source of entropy H is one that has as much information content as a source which puts out words equiprobably from a vocabulary of size 2^H ." Rabiner is teaching that a measure of entropy (H) can provide a system with a measure of how much information is in a piece of data, or frame of data. This is useful in pattern recognition systems. For instance, songs to be classified as Jazz or Classical, for example, might contain more information, or more notes and chord changes and rhythmic variation, than songs that would be classified as a songs corresponding to a group with a simpler structure. An expert in music theory is aware that a majority of popular music adheres to a I-IV-V chord progression, wherein the I chord is the root chord, and chords IV and V are the chords built upon the fourth and fifth notes of a scale, typically a major scale. Songs with more information, or more complex structure, would then be defined as having more entropy. It would have been obvious for one of ordinary skill in the art to combine the teachings of Blum and Rabiner for the purpose of better pattern recognition.

25. Regarding claim 2, the further limitation of claim 1, see Blum

... wherein the audio data is divided into frames, and the method is performed frame by frame. (Col. 6, lines 56-58)

In the combination, Blum teaches the division of audio data into frames, wherein the method is performed frame by frame.

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... wherein the audio data is divided into frames, and the method is performed frame by frame. (Col. 6, lines 56-58)

In the combination, Blum teaches the division of audio data into frames, wherein the method is performed frame by frame.

26. Regarding claim 3, the further limitation of claim 1, see

... further including calculating root mean squared values of the input audio data. (Col. 8, lines 1-3)

In the combination, Blum teaches RMS values.

27. Regarding claim 4, the further limitation of claim 2, see Rabiner

... wherein said entropy calculation process includes calculating:

$$S = - \sum_w p_w \log_2(p_w)$$

where S is the entropy of the frame, p_w is the normalized magnitude of a bin w of the audio data, and $\log_2(p_w)$ is the log base 2 of (p_w). (p. 449, eq. 8.13)

Rabiner teaches this entropy measure. It is inherent that in a digital system, a base 2 logarithm would be ideal for working with binary numbers.

28. Regarding claim 5, the further limitation of claim 2, see the preceding argument with respect to claim 3. Blum teaches the square root of the sum of squares, where the square root is a mapping function and adjusts the scale of the function.

29. Regarding claim 6, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches this feature.

30. Regarding claim 7, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a frequency domain transform.

31. Regarding claim 8, the further limitation of claim 7, see Blum

... wherein said converting of the input audio data signal from the time domain to the frequency domain includes performing a fast fourier transform on the audio data. (Col. 7, lines 56-61)

In the combination, Blum teaches an FFT.

32. Regarding claim 9, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches dividing the input signal into frames and averaging the features over all the frames.

33. Regarding claim 10, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a classification process using the feature vector, and this classification process determines a property class that describes the audio data (Col. 6, lines 7-10).

34. Regarding claim 11, the further limitation of claim 1, see the preceding argument with respect to claim 1. In the combination, Blum teaches a feature vector, and Blum teaches that a vector is a row vector and not an NxM array (Col. 5, lines 52-55). Blum teaches a 1xN array, wherein it is inherent that N can be 25.

35. Regarding claim 12, the further limitation of claim 1, see Blum

... wherein the audio data is formatted according to pulse code modulated format. (Col. 5, lines 24-50 and lines 64-66)

In the combination, Blum teaches a plurality of input devices in the system, wherein it is well known that optical disks containing audio data are encoded in a PCM format.

Inherently Blum teaches this feature.

36. Regarding claim 13, the further limitation of claim 12, see the preceding argument with respect to claim 12. In the combination, Blum teaches the use of a microphone and further teaches that a sound produced into the microphone can be searched (Col. 3, lines 52-55). It is inherent that the digitization step converts the analog waveform to a PCM format.

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37. Regarding claim 14, the further limitation of claim 1, see the preceding argument with respect to claim 7. The combination teaches this feature.

38. Regarding claim 15, the further limitation of claim 12, see the preceding argument with respect to claim 8. The combination teaches an FFT operation, which is performed on the audio data.

39. Regarding claim 16, the further limitation of claim 2, see the preceding argument with respect to claim 9. The combination teaches this feature.

40. Regarding claim 17, the further limitation of claim 1, see Blum

... further comprising performing a principal component analysis process on the spectral feature vector.
(Col. 6, lines 33-36)

Blum teaches a refining process on the feature vector, which refines the vector to principal components. Blum further teaches that the principal components are analyzed to determine classification.

41. Regarding claim 18, the further limitation of claim 1, see Blum

A computer readable medium bearing computer executable instructions for carrying out the method of claim 1. (Col. 5, lines 42-49)

Blum teaches computer readable mediums with instructions for carrying out the method taught by the combination.

42. Regarding claim 19, the further limitation of claim 1, see the preceding argument with respect to claim 12. Blum teaches a communication adapter, where it is inherent that this adapter is a modem, which uses keying or modulation to transmit and receive data. It is also well known in the art that computer executable instructions can be transmitted in a network.

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43. Regarding claim 20, the further limitation of claim 1, see the preceding argument with respect to claim 18. The combination teaches a computing device for performing the method.

44. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blum.

45. Regarding claim 28, the further limitation of claim 21, see Blum

A modulated data signal carrying computer executable instructions for performing the method of claim 21.
(Col. 5, lines 22-40).

Blum teaches a communication adapter, wherein it is inherent that modulated signals are transferred using communication adapters. It is well known that computer instructions can be transferred over a network using communication adapters.

46. Claims 26 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Gjerdingen.

47. Regarding claim 26, the further limitation of claim 22, see the preceding argument with respect to claim 31. Blum teaches the features of the parent claims 21 and 22, but Blum does not teach a level of confidence measure. Gjerdingen teaches a measure indicating the level of confidence regarding classification. It would have been obvious for one of ordinary skill in the art to combine the teachings of Blum and Gjerdingen for the purpose of refining the classification process.

48. Regarding claim 34, see the preceding argument with respect to claims 1, 17, 30, and 31. The combination of Blum and Gjerdingen teach these features of classifying data.

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49. Regarding claim 35, the further limitation of claim 34, see the preceding argument with respect to claims 1-5 and 34. The combination of Blum and Gjerdengen teach these features in a method of classifying data.

Double Patenting

50. Applicant is advised that should claim 7 be found allowable, claim 14 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

51. Applicant is advised that should claim 9 be found allowable, claim 16 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Conclusion

52. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Janata, U.S. Patent No. 5,667,470, Yourlo, U.S. Patent No.

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6,201,176, Beigi et al., U.S. Patent No. 6,246,982, Erdogan et al., U.S. Patent No. 6,567,771, and Logan et al., U.S. Patent No. 6,633,845.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel R. Sellers whose telephone number is 571-272-7528. The examiner can normally be reached on Monday to Friday, 9am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DRS



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SUPERVISORY PATENT EXAMINER